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Identification Information and Maintenance Sleeve for Recovery and Storage Vessels

Field of the Invention

This invention relates generally to proper labeling and transport of used waste material, and more particularly, to the improved method and apparatus for labeling such Recovery and Storage Vessels ("RSV"s) of a type commonly used for numerous commercial applications.

Background of the Invention

There is presently a need for a new, better method and apparatus for labeling waste containers used to hold gasses and liquids which are classified as 2.2 non flammable and are ozone depleting substances as defined by the Montreal Protocol. RSVs need to be labeled for several reasons. The current methods for labeling RSVs do not homogenously and completely satisfy these needs in one cohesive, legal label. Legally labeling a cylinder, which contains waste, is of critical importance considering the primary handlers of the waste, are



One reason to have a label on RSV container is to track the materials contained within the containers. RSVs are regularly recycled and will normally store a number of different materials at different times throughout their lifecycle. A typical cylinder will be expected to endure a 25-year life, but it will be recycled 3-4 times a year to be emptied of waste and then be cleaned, inspected and returned to service. There are approximately 75 different types and blends of refrigerants and a refrigerant reclamation center needs to identify the contents of up to 2000 containers per week. It is important to know the materials that were stored in the containers most recently to avoid undesirable chemical reactions and contamination between new materials being stored in the container with residual amounts of the previously stored materials.

Also, the name and address of the originator of the hazardous and controlled refrigerant material should be clearly identified on the label. It is required to track these hazardous materials from originator to distributor, thru transportation, to recycle and disposal facility (cradle to grave). The originator is not relieved of responsibility until the material is recycled or destroyed. Also, if there is an extra charge for disposal of particularly undesirable material, this charge must be assessed to the owner of the material, which is contained in the cylinder.

Present labeling apparatus for recovery and storage vessel content requires costly cleaning. A bead blast cabinet is used to remove all sticky labels. If recovery waste contents are not known, it is often safer to chemically clean the interior of the containers than to blindly store new materials within the container.

However, the cost of such cleaning is highly inefficient, particularly when knowing the history of recovery and storage vessels would lead to far fewer cleanings. As a result, lacking a quality label on the recovery and storage vessels can become costly.

Labels are also necessary for some government regulations. The Department of Transportation requires the contents of recovery and storage vessels be properly labeled for interstate transportation. A label must be properly fixed to the recovery and storage vessel to avoid losing the label and violating DOT regulations. Similarly, the label must be sufficiently removable to allow changing labels when the contents of the recovery and storage vessel change. Trucking companies and any handlers of refrigerant material are required by law to have the handling content and safety information contained on these labels. Therefore DOT regulations play a role in devising a proper label.

Handlers of this material are required to be informed of the safety treatment, safety handling and proper precautions for this material. First aid measures for possible accidents or events associated with the refrigerant materials should be listed on the recovery and storage vessel. Anyone coming into contact with the container should know what material they are dealing with. Present labeling systems often only identify the materials as recovered refrigerants. Cylinder owners require notification should leaking occur in transit. It is important refrigerant recovery cylinders contain this material and safety information.

Recovery and storage vessel labeling is also important for disposal of the containers. Environmental regulations specify the necessary steps for tracking and disposing of hazardous materials. Failure to keep containers carefully labeled can result in accidentally disposing of the materials in an improper manner. A proper label can assist recovery and storage vessel users in their efforts to protect the environment.

Recovery and storage vessels are usually shipped for refilling or other purposes. Owners would like a convenient means for putting shipping information or the reason for shipping on the container to make sure the container reaches its destination and used for its intended purpose. The needs of owners and others to label a container require a label of sufficiently large size to satisfy all of their needs.

Existing labeling practices and methods for refrigerant recovery cylinders do not meet all these tracking, identification and information requirements. Previous means of labeling recovery and storage vessels have proven ineffective. One method previously used to label recovery and storage vessels is tying a label made of paper or similar material to the container. Unfortunately, paper labels are prone to being destroyed in transit. Also, the strings used to tie the labels often breaks, causing the label to become lost. These cylinders are often used outdoors where rain and weather damage will destroy other labels. Another problem with paper labels is they are normally of insufficient size to carry all the information on them that is desirable in an organized manner. Finally, some of the DOT regulations require warnings of greater size than a paper label

can bear, or more permanent attachment than string. Therefore this type of labeling fails in a number of ways.

Another means of labeling recovery and storage vessels is painting the containers. Painting a cylindrical object is often clumsy. Painting is normally done with a can of spray paint, which makes broad lines, which makes inefficient use of the space available on the side of a recovery and storage vessel. Also, painting labels require further painting to remove the labels once the container is used for another purpose, which is an unnecessary expense. Sometimes users of the containers will paint over recovery and storage vessel histories to leave their own information on the containers, frustrating the purpose of the original marking. Environmentally, painting cannot be done everywhere because of air emission standards, which further restricts the use of painting application. Therefore painting is an unsatisfactory method of labeling.

Another means of labeling recovery and storage vessels is by attaching adhesive labels to the containers. Adhesive labels come in various forms and can be attached anywhere around the cylinder, which makes it more difficult to locate information. The searching for the appropriate labels makes processing the cylinder for recovery slow and difficult. The adhesive labels are often damaged in transit. The adhesive labels also must be removed every time a recovery and storage vessel is reused. Label removal often requires sandblasting or tedious scraping, which also damages and removes paint from the cylinder. The effort required to scrape and remove old labels normally results in the old labels remaining fixed to the container well after they are no

longer applicable. New labels are then confused with old labels and the entire purpose of having the labels becomes frustrated.

The final means of labeling refrigerant containers is used primarily for virgin (new) containers, as opposed to recovery (re-used) containers. Virgin material containers are stored in cardboard boxes with content information printed on the box exterior. This method of labeling has proven to be too costly and inefficient for recovery and storage vessels, which are processed with a starkly different method than virgin refrigerants.

### Summary of the Invention

The present invention is a novel method and apparatus for labeling recovery and storage vessels. The apparatus is a shrink-wrap label for labeling recovery and storage vessels. The label, when applied, will have plenty of space, much more than previously available, to list materials recently contained within the recovery and storage vessel. Some of the information contained on the label will be preprinted while other areas of the label will be writeable for listing use specific information. The label will have sufficient space and organized locations for DOT warnings, names of wholesale distributors, shipping consolidators, and other interim handlers of the containers, and owner's or user's notes. The label can identify the cylinder owner and provide emergency contact numbers as well as an Internet location for an MSDS sheet containing handling and safety information for the refrigerant material. The label should contain

reference to common identification terms, including chemical names and UN numbers for commonly recovered chemical refrigerants.

The label will sufficiently adhere to the container to maintain the list of materials recently contained. The label's durability will provide more convenient means for tracking and properly disposing of environmentally dangerous materials. The label will not be easily destroyed or lost, like paper labels. The label will also be more easily removed and neater than painting the recovery and storage vessels or attaching adhesive labels. Therefore this method and apparatus for labeling recovery and storage vessels is a substantial improvement on previous labeling means.

It is an object of the present invention to provide a single label for an RSV capable of displaying all the information necessary for handling the RSV.

It is another object is to provide a method of relabeling RSVs in which new identifying indicia and instructional information is applied to the cylinder and all old information is removed from the cylinder as an incident to the recycling process without the necessity for separate or adhesively applied labeling.

Another object of the present invention is to provide a label for complying with all Department of Transportation and Environment Protection Agency regulations for labeling waste containers.

Yet another object is to provide safety information on the RSVs to advise the general public of the contents of the RSVs and the related safety concerns.



### Brief Description of the Drawings

FIG. 1 is an illustration of a refrigerant cylinder embodying the present invention.

FIG. 2a is a portion of an illustration of one embodiment of informational indicia on a sleeve for the present invention.

FIG. 2b is a portion of an illustration of one embodiment of informational indicia on a sleeve for the present invention.

FIG. 2c is a portion of an illustration of one embodiment of informational indicia on a sleeve for the present invention.

FIG. 2d is a portion of an illustration of one embodiment of informational indicia on a sleeve for the present invention.

While the invention is susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof have been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions and equivalents falling within the spirit and the scope of the invention as claimed.

### Detailed Description of the Drawing

There are several ways this invention could be applied and used. One method is to have shrink-wrap sleeves slid around a recovery and storage vessel. Heat is then applied to the sleeves to "shrink" the sleeves onto the

vessel using the same methods that normal shrink-wrap employs. Recovery and storage vessel owners or users begin with empty vessels with the "fresh" sleeves in place to eventually fill out the information on the sleeve concerning the contents and source of the vessel contents. Upon returning the vessels to the refrigerant reclamation center, the contents are analyzed and pumped out. The old sleeve is removed and a new one applied, starting the cycle again.

In addition to the sleeve being useful for informational purposes, the protective sleeve will save painting the vessel each reclamation, identify the vessel, identify the vessel owner, prolong the life of the cylinder, save hours of maintenance and preparation, present a more professional service, and provide various information required by the DOT for over-highway shipment of these refrigerant materials and high pressure vessels, all in a clear, concise and easily referenced and used manner.

This invention is a shrink-wrap label removably attached to recovery and storage vessels in a durable manner. Different embodiments of the invention will carry at least elements of the following group on the label - safety warnings, medical information, source of the vessel, information about the source of the vessel, billing information, customer information, vessel owner information, customer notes, MSDS contact information, hazard warnings, vessel content information, DOT required information and recovery and storage vessel information. This invention also carries an inventive use of attaching the novel label to recovery and storage vessels through heat shrink. The inventive method can be further specified as removing the shrink wrap labels from vessels when

the vessels are emptied and using additional labels as the vessels are sent to be refilled with either similar or different materials.

Referring now more particularly to the drawings, there is shown in Figure 1 an illustrative refrigerant cylinder 10 embodying the present invention. The cylinder 10 has a hollow refrigerant containing body 12 with a top and bottom 14, 15. A conventional valve 16 is mounted in the top 14 for emptying or charging the body 12 with refrigerant or other similar substance as needed. Also, a collar 18 is mounted to the top 14 to protect the valve 16. It will be understood that the cylinders 10 are constructed consistent with industry standards.

In accordance with the invention, the refrigerant cylinder 10 has a heat-shrink plastic sleeve 20 or cover in tight fitting surrounding relation to the body 12 for providing all the labeling required for a refrigerant recovery cylinder 10. To this end, the body 12 has a plastic sleeve 20 preferably made of a linear heat-shrink, polyvinyl chloride ("PVC") material. The PVC material of the sleeve may be commercially available type having a relatively thin gauge thickness, such as about 0.002-0.003 mm.

In further carrying out the invention, the heat-shrink plastic sleeve 20 is printed with indicia 22 and operating instructions so as to eliminate the necessity for separate adhesively applied labeling.

The sleeves 20 may be produced by pre-printing an elongated web of PVC heat-shrinkable plastic, folding the web over upon itself, heat-sealing the longitudinal edges, and cutting the web into the individual sleeves 20 along longitudinally spaced cut lines. The heat-shrink plastic sleeves 20 are formed

such that the lateral shrink will be transverse to the longitudinal or vertical axis of the body 12 and the longitudinal shrink direction is parallel to the axis of the tank. The sleeves 20 are formed sufficiently large to enable easy positioning over the top 14 of the body 12, but small enough that upon heating it will shrink into tightly fitting relation with the body 12. There is no novelty in the heat-shrink method of applying heat-shrink plastic to a cylindrical shape and heat shrinking is known in the art. The novelty of the present invention is limited to the concept of replacing inferior forms of refrigerant cylinder 10 labeling with a heat-shrink, writeable sleeve 20. One method of writing on the sleeve is with a wax writing utensil, although other methods of writing on heat-shrink plastic are available.

The present invention is intended to be the one label that will compile all required statutory information, replacing dozens of adhesive labels or other labeling apparatus. The cylinder sleeve 20 is intended additionally to contain all information not required by statute, but desirable, such as emergency numbers for any and all parties responsible for the cylinder. The sleeve 20 is intended to provide quick, easy to read, repetitive access to essential information. The sleeve 20 is easy to apply and easy to remove, at which point it can be used for record-keeping. Generally, it is a more efficient means of complying with the regulatory and cylinder handler requirements than any existing methods

Figures 2a-d show one embodiment of a refrigerant recovery cylinder sleeve 20. The sleeve 20 contains safety warnings 30. The safety warnings 30 include first aid 32 instructions in case someone is exposed to the body 12 contents. The safety warnings 30 include precautionary instructions 34 to reduce

risks associated with refrigerant materials. Some of the safety warnings 30 are required by the Department of Transportation and Environmental Protection Agency. The safety warnings 30 as provided by the sleeve 20 are more reliable than simple adhesive labels and can therefore be expected to be more useful for protecting the general public.

The sleeve 20 also contains refrigerant information 40. The refrigerant information 40 includes the contents of the body 12 and the weight of the cylinder 10 with the refrigerant contents. Finally, the sleeve 20 contains body information 50, which is important for recovery of the cylinders 10, particularly time spent identifying cylinder contents.

The invention is also a method of recording information regarding contents of a refrigerant vessel. The first step of the method involves marking the contents of the vessel on a heat shrink label. The label is then applied to the vessel through heat shrink thereby requiring no adhesives. Once the vessel is ready for reuse, the label is removed from the vessel and the stored in a record system. The Environmental Protection Agency has record keeping requirements and any reputable reclamation center will independently desire to keep an accurate record of activities. By saving the label, another reliable method of record keeping is created.

For this method, the label can contain all necessary information regarding the contents thereby obviating the need for any other labels.

For this method a person can also mark the label after applying the label to the vessel.